

Course Title: Control Engineering  
Date: -11-2016 (Midterm term)Course Code: CCE3115  
Allowed time: 1 HoursYear: 3<sup>rd</sup>  
No. of Pages: (1)**Problem number (1) (10 Marks)**

The open loop T.F of a system is given as:

$$G(s)H(s) = \frac{K(s+2)(s+3)}{s(s+1)}$$

- (i) Sketch the root locus.
- (ii) Determine the range of K for system stability.
- (iii) Find the value of K at critically damped response.

**Problem number (2) (10 Marks)**

A unity feedback control system has an open loop T.F as follows:

$$G(s)H(s) = \frac{100}{s(s^2 + 11s + 10)}$$

- (i) Sketch the bode diagram for the system.
- (ii) Determine the gain margin (GM), phase margin (PM), the phase crossover frequency ( $\omega_{pc}$ ), the gain crossover frequency ( $\omega_{gc}$ ).
- (iii) State whether the system is stable or not.
- (iv) Which is better: a system with GM=1000 dB or a system with GM=100 dB? Why?

*Good luck*

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